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WITNESS my hand this
Fourth day of May 2004

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Regulation 3.2

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AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION

for the invention entitled:

"Footwear for gripping and kicking a ball"

The invention is described in the following statement:

FOOTWEAR FOR GRIPPING AND KICKING A BALL

FIELD OF THE INVENTION

The present invention relates generally to athletic footwear. More particular, this invention relates to shoe uppers for athletic footwear used in football or other sports, which require kicking and/or dribbling of a ball with the player's feet. Throughout this specification the term "football shoe" will be used to refer to any type of footwear worn to play sports involving propulsion of a ball with a foot.

BACKGROUND OF THE INVENTION

Football shoes are used by a wearer to dribble, kick and pass a ball in various sports, such as football (soccer), Australian Rules, rugby league, and rugby union. In each of these sports, a player relies on being able to handle and control the ball.

It is advantageous if a player's football shoes assist in handling and controlling the ball easily and effectively. For example, it is advantageous if a football shoe enables the player to impart spin and increase power to the ball as it is kicked, or is able to consistently confer such control over a ball in adverse environmental conditions, such as in cold, wet and/or muddy environments.

There have been many attempts to incorporate into a football shoe some type of ball handling surface that provides the wearer with better grip and control of a ball. Usually, the ball handling surface comprises a series of raised projections covering the shoe to provide the greater frictional grip and therefore control of a ball.

SUMMARY OF THE INVENTION

It is an object of the invention to provide a unique and useful alternative to such ball control surfaces.

One aspect of the present invention provides a shoe upper for a football shoe, including a plurality of resiliently deformable protrusions extending from an outer surface of the shoe upper for contact with a ball, each protrusion forming at least an inner contoured shape portion and an outer contoured shape portion, the outer shape portion being deformable radially relative to said inner shape portion to promote engagement of said protrusion with said ball.

The arrangement of an outer contoured shape portion that is deformable radially relative to the inner contoured shape portion stimulates ball feel and grip for a player, the shoe upper acting like a "sensory skin". Thus, a "glove" or "gloving" effect takes place, where pace is taken off the ball and the ball is momentarily held or supported on the surface via the deformed outer shape portions, before being assisted in its redirection by the outer shape portions resiliently returning to their initial undeformed state. Furthermore, the arrangement of the contoured shape portions of each protrusion provides the shoe upper with multiple contact areas for the protrusions to engage the ball. Accordingly, a player wearing a shoe incorporating the shoe upper according to this aspect of the invention is provided with enhanced ball control and so is able to produce a variety of desired effects on the ball, such as spin and/or power when kicking the ball.

The outer shape portion may be deformable either radially inward or radially outward relative to the inner shape portion.

It is particularly preferred that the outer shape portion is deformable radially outward. The outer shape portion is preferably inclined outward to promote radially outward deformation. Preferably, there is a plurality of successive outer contoured shape portions, each of said successive contoured shape portions being bounded by the next successive contoured shape portion. In a particular preferred embodiment, each of the outer contoured shape portion forms an annular outer ring, each outer ring being bounded by the next successive ring.

Preferably the inner shape portion and the outer shape portion are generally concentric.

The inner contoured shape portion is preferably outwardly deformable. It is preferred that the inner contoured shape portion defines a ball contacting area of the shoe upper. The ball contacting area preferably corresponds to a sweet spot of the shoe upper.

The contoured shape portions are preferably selected from any one of circular, triangular, rectangular, ovoid, spiral, diamond, or other polygonal shapes. The contoured shape portions can form other shapes, such as semi-circular, "V"-like, flower-like, and even irregular shapes. The contoured shape portions may have the same shape within a protrusion. In a preferred embodiment, one or more contoured protrusions form a fingerprint-like pattern.

It is preferred that one or more of the contoured shape portions are formed as a continuous shape. Alternatively, two or more of the contoured shape portions can be formed as a broken outline of a shape. A broken outline of a shape can provide additional purchase on the ball.

Preferably, the contoured shape portions forming continuous shapes have one or more openings to permit debris to pass through. By providing these openings, debris such as dirt, mud, or water that may have been captured in the contoured shape portions can be allowed to escape, thus creating a self-cleaning mechanism and preventing the protrusions from becoming clogged in adverse weather or playing conditions. Preferably, one or more of the openings of each of the contoured shape portions are aligned with a corresponding opening or openings of other contoured shape portions so as to form a channel to facilitate the passage of debris from the contoured shape portions. Alternatively, an opening of one contoured shape portion can be offset with respect to an opening of another contoured shape portion. The openings can be of any shape – polygonal, rectangular, circular, and the like. In a preferred embodiment, the openings have a semi-circular shape. The openings are preferably formed at the base of each contoured shape portion, although other

locations of the openings in each contoured shape portion are possible. For example, the openings can be formed at the top of the contoured shape portions in the form of slots.

Further advantages of providing these openings include the use of less rubber to make the contoured shape portions and thus reduced shoe weight, and the contoured shape portions being able to deform to a greater extent.

Similarly, where two or more of the contoured shape portions are formed into a broken outline of a shape, the gaps between the contoured shape portions in one broken outline can be aligned or offset with respect to the corresponding gaps between contoured shape portions of another broken outline. When the gaps are aligned, they preferably form channels to permit debris to pass through.

In one embodiment, the inner and outer contoured shape portions are preferably spaced apart from each other. In another embodiment, the inner and outer contoured shape portions are joined to form inner and outer arcs of a continuous spiral.

In a further embodiment, the inner contoured shape portion is in the form of a solid, such as a peg. The peg may be cylindrical, rectangular, or any other shape. The outer shape portion or portions are preferably in the form of a ring or rings. The ring or rings may be a continuous shape or formed as a broken outline of a shape. In this particular embodiment, by making the inner contoured shape a solid, it provides additional power to redirecting the ball.

The inner and outer contoured shape portions may have ball contacting surfaces which are roughened or patterned to further promote control of the ball. The ball contacting surface can have a step-like teeth pattern or wave-like pattern.

The inner and outer contoured shape portions may have a cross-sectional profile. The cross-sectional profiles preferably include a rectangular, sinusoidal, triangular, arcuate, or polygonal profile, or a combination of such profiles. A sinusoidal profile may form U-

shaped troughs between the contoured shape portions while a triangular profile may form V-shaped troughs.

Various properties of the contoured shape portions may be altered to influence the degree of control over the ball and produce different effects. Such properties that may be altered include, but are not limited to, their composition (rubber, carbon fibre, fabric, synthetic resin, plastic, etc), height, angle of inclination, and thickness. The combination and various configurations of composition, height, inclination, and thickness of the contoured shape portions influence grip, energy absorption, spin, and the capacity to generate greater power and accuracy when kicking. For example, to assist power kicking, some of the contoured shape portions may be less deformable, be thicker, or made of a harder compound to resist deformation upon impact with the ball, whereas for dribbling, the contoured shape portions may be thinner and more deformable so the player can feel the ball.

The properties of the contoured shape portions may be selected according to their respective locations in the protrusion. One or more of the protrusions may include a combination of contoured shape portions having different compositions, height, and thickness. In one embodiment, the composition of the contoured shape portions in the throat region of the shoe upper is such that these contoured shape portions are less deformable than the contoured shape portions which cover the lateral and medial regions of the shoe upper, the latter contoured shape portions having a different composition.

In addition, the spacing between the contoured shape portions may be varied to influence the degree of ball control as required, by either having the contoured shape portions loosely adjacent to each other, spaced quite far apart, or spaced apart at regular intervals from each other.

The contoured shape portions are generally formed from a single compound, such as rubber or suitable synthetic or plastic alternative.

Another aspect of the invention provides a shoe upper for a football shoe, including a plurality of resiliently deformable protrusions extending from the outer surface of the shoe upper for contact with the ball, each protrusion including means for promoting deformation of said protrusion upon engagement with the ball.

In this aspect of the invention, the deformation promoting means assists in providing the protrusions with an increased "catapult" effect. That is, when the protrusions come into contact with the ball, the protrusions deform to a greater extent due to the deformation promoting means and so permit the protrusions to apply more force to the ball when it is redirected as the protrusions return to their undeformed state. Thus, the strength of kicks to the ball is increased.

Preferably, the deformation promoting means includes a groove adjacent to each said protrusion to increase the extent to which said protrusion can deform. In one embodiment, the groove extends parallel to the length of the protrusion.

The deformation promoting means preferably includes a means for supporting each said protrusion during deformation. The supporting means may include a spring-like mechanism. Preferably, the supporting means includes a pad to brace the protrusion. In one embodiment, the pad is located within the groove. The pad may be longitudinal in extent and be parallel to the protrusion. The pad may be made of a resilient material, such as rubber. The pad may also be hollow to contain a resilient material, such as a gel, liquid, or gas, including air.

Preferably, each said protrusion includes a resilient strip for contact with the ball.

It is also preferred that this aspect of the invention as described above is also applied to the first aspect of the invention, in that the contoured shape portions may have deformation promoting means.

It is an object of preferred embodiments of the present invention to provide a shoe upper that gives enhanced control and grip of a ball, or at least provide a useful alternative to other known ball control surface arrangements in athletic footwear.

BRIEF DESCRIPTIONS OF THE DRAWINGS

Preferred embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, as set out below.

Figure 1 is a side view of a sports shoe according to one embodiment of a first aspect of the present invention.

Figure 2 is a top view of the shoe of Figure 1.

Figure 3 is a cross-sectional view of the contoured shape portions of Figure 1 in an initial state.

Figure 4 is a cross-sectional view of the contoured shape portions of Figure 1 in a deformed state in contact with a ball.

Figures 5A-5M are top views of alternative shapes of the contoured shape portions of Figure 1.

Figures 6A and 6B are side views of preferred embodiments of the invention, while Figure 6C is a top view of the protrusion of Figure 6A.

Figures 6D-6F are top views of another preferred embodiment of the invention.

Figures 7A-7D are cross-sectional views of the contoured shape portions having different cross-sectional profiles.

Figure 8 is a partial cross-sectional view of a further embodiment of a shoe in accordance with the present invention.

Figure 9 is a side view of a further embodiment of a shoe in accordance with the present invention.

Figure 10 is a cross-sectional view of the contoured shape portions of Figure 9.

Figure 11 is a partial top view of the shoe of Figure 9.

Figure 12A is a partial top view of an alternative embodiment of the invention.

Figures 12B-12C are side views of alternate embodiments of the invention.

Figure 13 is a perspective view of a further embodiment of the present invention.

Figure 14 is a side view of an embodiment in accordance with a second aspect of the present invention.

Figure 15 is a cross-sectional view of the protrusions of Figure 14 in an initial state.

Figure 16 is a cross-sectional view of the protrusions of Figure 14 in a deformed state in contact with a ball.

Figure 17 is a cross-sectional view of an alternative embodiment of the protrusions of Figure 14 in an initial state.

Figure 18 is a cross-sectional view of a further alternative embodiment of the protrusions of Figure 14 in an initial state.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the present invention will now be described with reference to the figures where like reference numbers indicate identical or functionally similar elements. While specific configurations and arrangements are discussed, it should be understood that this is done for illustrative purposes only. A person skilled in the relevant art will recognize that other configurations and arrangements can be used without departing from the spirit and scope of the invention. It will be apparent to a person skilled in the relevant art that this invention can be employed in a variety of other applications.

A football shoe 100 in accordance with a preferred embodiment of the present invention is shown in Figures 1-4. The shoe 100 has an upper 101 whose outer surface includes a ball control region 104 with resiliently deformable protrusions 105, each protrusion 105 including contoured shape portions. The contoured shape portions include an inner ring 122 being bounded successively by outer rings 120. Football shoe 100 also includes a sole 102, provided with studs 103, a heel portion 106, a conventional fastening portion 107, a toe cap portion 108, a side wall 109, and a tongue portion 110.

The outer rings 120 are spaced apart at different distances, and some of the outer rings 120 have common walls, as indicated at 124. As can be seen more clearly in Figure 4, the outer rings 120 are outwardly deformable relative to the inner ring 122 when each protrusion 105 comes into contact with a ball. The outward deformability of outer rings 120 stimulates the grip and feel of the ball on shoe 100 for a player, acting like a sensory skin and producing a gloving effect; that is, the ball is momentarily supported on deformed outer rings 120 before being assisted in its redirection by outer rings 120 returning to their undeformed state, as seen in Figure 3. This allows a player wearing shoe 100 to exert more control of a ball, for example, a player can impart more spin to the ball, resulting in greater swerving of the ball.

In this particular embodiment, inner ring 122 is also outwardly deformable as seen in Figure 4. This provides additional grip and feel. However, the inner ring 122 need not be deformable, or as deformable as the outer ring 120, and can be more resilient to assist in increasing the force applied to the ball when directly kicked.

As shown in Figure 2, the protrusions 105 formed by inner ring 122 and outer rings 120 are arranged in a particular area of the upper 101, such as the common regions where a ball is kicked or controlled. For example, as seen in Figure 2, protrusions 105 are arranged on the lateral regions (both sides of the front of shoe 100) and the medial region at the top of the front of the shoe 100. The central protrusion 105 in the medial region has outer rings 120 generally concentric to the inner ring 122 and to each other while the rings of the protrusions 105 on either side of the foot are off-centred. With certain type of kicks and kicking regions of the shoe; such as the medial region, it is desirable for the protrusions 105 to deform to a lesser extent than the protrusions of other regions. In such cases, a certain amount of force is still applied to the ball due to the resilient nature of the protrusions 105.

The ball control region 104 can be anywhere on the outer surface of upper 101 as required, including the heel area. For example, region 104 may correspond to a "sweet spot" for contact with the ball so as to maximise control, power and feel of the ball.

Figures 3 and 4 illustrate how the first embodiment of the invention works. Figure 3 shows the protrusions 105 in their initial undeformed state with inner ring 122 and the next successive outer ring 120. The resiliently deformable protrusions 105 are able to store and release energy so that when they are deformed upon contact with a ball (Figure 4), energy is stored and then transferred to the ball as the protrusions 105 return to their undeformed state when the ball is released. When a ball contacts region 104, the inner ring 122 and outer ring 120 deform or "flatten" outwardly to produce a glove effect where the ball is temporarily supported by the deformed rings 120, 122, thus providing greater feel of the ball to the player and allowing for greater control of the ball. When a player applies a force to redirect or impart spin to the ball, the rings 120, 122 assist in applying additional

force to the ball by returning to their undeformed state and transferring the energy stored upon deformation to the ball.

Thus, by forming the protrusions 105 on upper 101 with at least an inner contoured ring 122 and outer contoured ring which is outwardly deformable relative to inner ring 122, the protrusions 105 confer a player wearing shoe 100 with greater feel and grip of the ball, who is therefore able to control the ball more effectively. While this embodiment has been described with the outer contoured rings 120 deforming radially outward, the invention and this embodiment may have the outer rings 120 deforming radially inward relative to the inner ring 122.

The rings 120, 122 generally have a uniform cross-sectional profile of substantially equal height and width. The rings 120, 122 may be from approximately 1mm to 10mm, in both height and width. The thinner the contoured shape portions, the more deformable and this results in the ball moving rapidly off the ball control region 104.

In addition, the outer rings 120 may be inclined outwardly with respect to the inner ring 122 to further promote outward deformation.

Upper 101 is preferably made of leather. However, upper 101 may be made of any suitable synthetic and/or lightweight material, including rubber and a combination of fabric and plastic. The ball control region 104 may be formed integrally with upper 101 or be attached or bonded to upper 101. Sole 102 and studs 103 are integrally formed from plastic, usually by way of an injection molding process. Alternatively, sole 102 and studs 103 may be formed separately and attached to one another in any means apparent to a person skilled in the art.

While in the first embodiment the contoured shape portions are in the form of rings, other types of shapes are within the scope of the invention. Referring to Figures 5A-5E, several variations of the shapes that can be used with respect to the first embodiment are illustrated. Figures 5A, 5B, 5C, and 5D respectively show protrusions having diamond

(111), square (112), rectangular (113), and spiral (156,158) contoured shape portions. Each of the contoured shape portions 111, 112, 113, and 156, 158 are generally identical with each other in the same protrusion.

Another possible shape is shown in Figure 5E. The protrusion 140 is a continuous spiral formed by the spiral outer arc portions 144 substantially surrounding inner arc portion 142 of lesser radius so that the outer arc portions 144 are outwardly deformable relative to the inner arc portion 142 of the spiral to promote contact with the ball and enhance ball control via the glove effect. The outer arc portions 144 may be inwardly deformable relative to the inner arc portion 142. Figure 5F shows another variation where two parallel spirals 150, 152 form the protrusion.

Different contoured shapes may be used in a single protrusion. In addition, individual shape portions can be formed by defining an outline of the shape rather than being a continuous shape. Both of these variations are shown in combination in Figure 5G. In the protrusion of Figure 5G, a continuous inner rectangular shape portion 132 is provided with a triangular outer shape portion formed by elements 133a, 133b and another outer shape portion 135 is made up of discrete elements 135a, 135b, 135c, to form a generally circular shape. Alternatively, the individual shape portions may have one or more slits to divide each shape portion into discrete elements.

Figures 5H-5M illustrate other possible variations in the shapes formed by the contoured shape portions. In Figure 5H, protrusion 200 has inner shape portion 202 and successive outer contoured shape portions 204. Each of these contoured shape portions is formed as a semi-circle. The semi-circular contoured shape portions are positioned alternatively on either side of an imaginary center line 206. The positioning of the semi-circular contoured portions 202, 204 can be varied as required. Similarly, protrusion 210 in Figure 5I has inner shape portion 212 and outer shape portions 214, each being in the form of V-like shapes.

The protrusions 220 and 230 of Figures 5J and 5K, respectively, have contoured shape portions formed as the broken outline of shapes. In Figure 5J, the individual elements 222a, 222b, 222c, 222d slightly overlap each other, as do the elements 224a-224g of the outer shape portion. In Figure 5K, the inner shape portion 232 and outer shape portion 234 form flower-like shapes in protrusion 230. Each "petal" or element 232a-232e in inner shape portion 232 can be positioned in alignment with or offset to a corresponding "petal" or element 234a-234f in outer shape portion 234.

Figures 5L and 5M show combinations of different shapes in the one protrusion. Protrusion 240 has an inner shape portion 242 in the form of a semi-circle and an outer shape portion 244 in the form of a closed circle. Protrusion 250 has an inner shape portion 252 composed of concave elements 252a-252d facing outwards, and an outer shape portion 254 being in the form of a continuous sinusoidal or corrugated shape.

It is evident to a person skilled in the art that any of the above features can be used separately. For example, the spirals in Figures 5E and 5F can be formed as an outline similar to that shown in Figure 5E. Similarly, the protrusion shown in Figure 5G can be made of contoured shape portions forming continuous rectangular, triangular, and circular shapes.

Another preferred embodiment of the invention is shown in Figure 6A. The protrusion 170 has an inner contoured shape portion 172 and outer contoured shape portions 174, each forming continuous shapes. In particularly adverse playing conditions, such as when it is raining or the field is muddy, debris such as mud, soil, and/or water can be trapped between the contoured shape portions 172, 174. Therefore, in this embodiment a series of openings 176 are formed in the walls of each contoured shape portion to permit debris to escape from the contoured shape portions and protrusion 170. Thus, the protrusion 170 has a self-cleaning mechanism so that the protrusion 170 is able to provide enhanced ball control without being inhibited by debris clogging the contoured shape portions and otherwise hampering the deformability of the contoured shape portions. While the openings 176 are illustrated in Figure 6A as being semi-circular, any polygonal shape, such

as rectangular, circular, triangular, etc., can be used. In addition, the openings 176 are positioned at the base of the contoured shape portion to maximise the escape of debris from the contoured shape portions. However, other locations for openings 176 are possible, such as within the contoured shape portion to form an aperture therein or being spaced from the base and near the top of the contoured shape protrusion (Figure 6B). Furthermore, individual openings 177, 178 can have varying depths, as shown in Figure 6B.

Moreover, the openings 176 can be aligned with corresponding openings 176 in other adjacent contoured shape portions so that a channel can be formed from the inner contoured shape portion to the outer contoured shape portions, as shown in Figure 6C. The dotted lines 179 indicate the path of the channels formed by openings 176 in the protrusion 170.

A similar self-cleaning mechanism can be also provided where the contoured shape portions form broken outlines of shapes in the protrusion. As shown in Figure 6D, protrusion 181 has an inner contoured shape portions 183 and contoured outer shape portions 185, each group of which form the broken outlines of circular shapes. The gaps 187 between the individual contoured shape portions 183, 185 are aligned with corresponding gaps in other contoured shape portions 185 so as to form channels 189 to facilitate the escape of debris such as soil, mud, and/or water from the protrusion 181. The gaps 187 need not be aligned with other gaps and can be offset relative to each other, as is shown in Figure 6E.

In addition, the channels can be formed where contoured shape portions form differing continuous shapes or broken outlines of shapes or even a combination of continuous shapes and broken outlines of shapes. As is shown in Figure 6F, a protrusion 190 has inner contoured shape portions 192 forming the broken outline of a circle, followed by outer contoured shape portions 194 forming the broken outline of a rectangular shape and an outer contoured shape portion 196 forming a continuous circular shape. The continuous

circular shape has openings 197 which are aligned with the gaps 198 between individual shape portions of the broken outlines 192, 194 so as to form channels.

Figures 7A-7D illustrate various cross-sectional profiles for the contoured shape portions. The contoured shape portions may have a rectangular or square-like cross-sectional profile (114 in Figure 7A), a sinusoidal profile forming U-shaped troughs (115 in Figure 7B), a combination of alternating profiles forming alternating U-shaped and V-shaped troughs (116 in Figure 7C), or a triangular profile (Figure 7D). The triangular profile illustrated in Figure 7D has a substantially perpendicular side and an inclined side. The inclined side can face towards or away from the inner contoured shape portion. The triangular profile enhances the deformability of the contoured shape portions. It is also possible to have a combination of or alternating rectangular/square like, sinusoidal, triangular, or other cross-sectional profiles. The type of cross-sectional profile selected will affect the deformability (and hence the "grip" produced) of the contoured shape portions as well as the weight of the shoe.

Figure 8 shows another embodiment where the protrusions 105 are integrally formed in shoe upper 101 and recessed into region 104.

Figures 9-11 show an alternate embodiment of the first aspect of the present invention. Football shoe 600 has an upper 601 and sole 602 provided with studs 603. Ball control surface 604 is attached or bonded to outer surface of upper 601 and includes a plurality of protrusions 605. Each protrusion 605 has an inner contoured shape portion 622 and generally concentric outer contoured shape portions 620. A "sweet spot" area 606 is defined by inner shape portion 622 to expose and isolate the ball contact sweet spots of the shoe 600 and to minimise shoe weight. The sweet spot area 606 is generally convex in shape. As shown in a cross-sectional view in Figure 10, the contoured shape portions 620, 622 have different heights so that outer shape portions 610 near the sweet spot area 606 (and inner shape portion 622) are of shorter height than outer shape portions 611 spaced further away, the outer shape portions 611 becoming progressively higher as they move away from the sweet spot area 606. This allows for the inner and outer contoured shape

portions 620, 622 to accommodate the curved surface 612 of the ball and promote contact with sweet spot area 606. In the previously described embodiments, the contoured shape portions had similar heights.

The concentric shape portions 620, 622 of ball control surface 604 are each formed of a single compound, such as rubber or a suitable synthetic or fabric. However, as discussed generally above, the compound, height, spacing and thickness of the concentric shape portions 620, 622 may vary on the football shoe upper 601.

In addition, referring to Figure 11, a protrusion may be provided in throat region 607 which is more resilient and less deformable than the clusters of the protrusions 605 which cover the lateral 609 and medial 608 regions of the upper 601. The less deformable protrusion in throat region 607 gives extra power when ball contact occurs from within this region of the shoe (such as in kicking the ball). In contrast, medial region 608 and lateral region 609 of ball control surface 604 have protrusions 605 which are more deformable to give the player ball feel and grip.

Figure 12A shows an alternative embodiment of medial region 608 including two protrusions 630, 632 which are less deformable and more resilient than the lateral and medial protrusions 605. In this embodiment, the shoe laces in the fastening portion extending into the medial region 608 are hidden by a length of material. Other embodiments may feature more than two protrusions within the throat, heel, medial or lateral regions. For example, as shown in Figure 12B (protrusions 670) and in Figure 12C (protrusions 680), several protrusions are located in the lateral regions. The protrusions in these embodiments can be arranged to expose the "sweet spots" of the shoe upper.

Figure 13 shows yet another embodiment of the first aspect of the invention. The shoe 700 has upper 701 with protrusions 705 exposing a "sweet spot" 706. The protrusions 705 are formed by contoured shape portions 720, 722. The inner shape portion is a cylindrical solid or peg 722, while outer shape 720 is an annular ring surrounding peg 722. The protrusions 705 formed by the peg 722 and ring 720 are formed over the outer surface of

upper 701. The peg 722 is more resilient and less deformable than ring 720. The greater resilience of peg 722 provides more force to the ball on contact, thus increasing the kicking power of the shoe 700. The ring 720, being more deformable, provides grip and feel of the ball to the player and thus enhances more finesse skills, such as dribbling, imparting spin, and other aspects of ball control. Successive outer rings like ring 720 can be added. The ring 720 may be substituted with a continuous shape or a broken outline shape such as those illustrated in Figures 5A-5M and may include openings or gaps as illustrated in Figures 6A-6F. For example, a solid inner peg can be provided at the center of protrusion 200 in Figure 5H with "inner" shape portion 202 in effect becoming another outer shape portion. Similarly, solid inner pegs can be added to the protrusions in Figures 5A-5G, 5I-5M. Again, successive outer shape portions can be provided. The wall thickness for ring 720 may be less than the thickness of peg 722 and/or can be made of a more deformable material. Outer shape 720 is preferably inclined outward to promote radially outward deformation.

Figure 14 is a side view of a throat region 607 of a football shoe in accordance with a preferred embodiment of a second aspect of the present invention. The protrusions 613 (which are not the same as the protrusions of the previous embodiments) are bar-like and extend transversely across the throat region 607 of the ball contact surface. In this embodiment, an inclined V-shaped groove 750 is provided so as to form an inclined support surface 760, as shown in Figure 15. The groove 750 and supporting surface 760 assist in increasing the amount of deformation of the protrusion 613 and so enhance the amount of force than can be applied to ball 612 upon contact. As shown in Figure 16, the bar protrusions 613 deform to a greater extent than usual along arc 614 due to the space provided by groove 650 towards the heel of the shoe. The supporting surface 760 provides added resilience to the protrusion 613 so that upon contact with the ball 612, the protrusion 613 is able to apply more force to the ball in addition to the stored energy from the increased amount of deformation of protrusion 613 due to groove 750, thus resulting in greater kicking power and ball velocity.

In a variation, the bar like protrusions 613 may be inclined forward towards the toe as shown in Figure 17 to further increase the arc of deformation 614 of protrusion 613, thereby storing and releasing a higher level of energy and apply more force to the ball.

Another variation is illustrated in Figure 18. In this embodiment, the bar like protrusions 613 may have a harder and more resilient layer of material 615 in the ball facing contact part of the protrusion 613. This added resilience to protrusion 613 means more force is required to deform protrusion 613 and so increased power can be supplied to the ball. In addition, a supporting pad of elastic rubber, gel, or air filled void 617 may be provided in groove 650 to enhance the amount of energy stored and transferred to ball 612. Alternatively, a spring-like mechanism can be used to support the protrusion 613. Both the resilient strip 615 and the supporting pad 617 can be used separately, rather than together as shown in Figure 18.

It should be noted that the groove 650, resilient strip 615 and supporting pad 617 (or spring-like mechanism) are individually applicable to all previous embodiments in the first and second aspects of the invention as illustrated in the previous Figures where maximising kicking power of the shoe is required. That is, individual contoured shape portions may utilize a groove, resilient strip and/or supporting pad (or spring-like mechanism).

The ball control surface and the protrusions formed by the contoured shape portions may be removable from the upper and available in a kit like assembly to modify a conventional shoe. For example, the ball control region could be attached with snaps, a hook and pile fastener or in any other convenient manner. Individual contoured shape portions might also be replaceable so that an individual football player may tailor their ball control region to suit their individual needs or desires.

While various embodiments of the present invention have been described above, it should be understood that they have been presented by way of example, and not limitation. In particular, while the above embodiments have been described as having outer shape

portions deformable radially outward relative to the inner shape portion, the scope of the invention includes the embodiments of like structure where the outer shape portions are deformable radially inward. It will be apparent to persons skilled in the relevant art that various changes in form and detail can be made therein without departing from the spirit and scope of the invention. Thus the present invention should not be limited by any of the above-described exemplary embodiments.

The reference to any prior art in this specification is not, and should not be taken as, an acknowledgment or any form of suggestion that that prior art forms part of the common general knowledge in Australia.

DATED this 4th day of December, 2003

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FIGURE 1

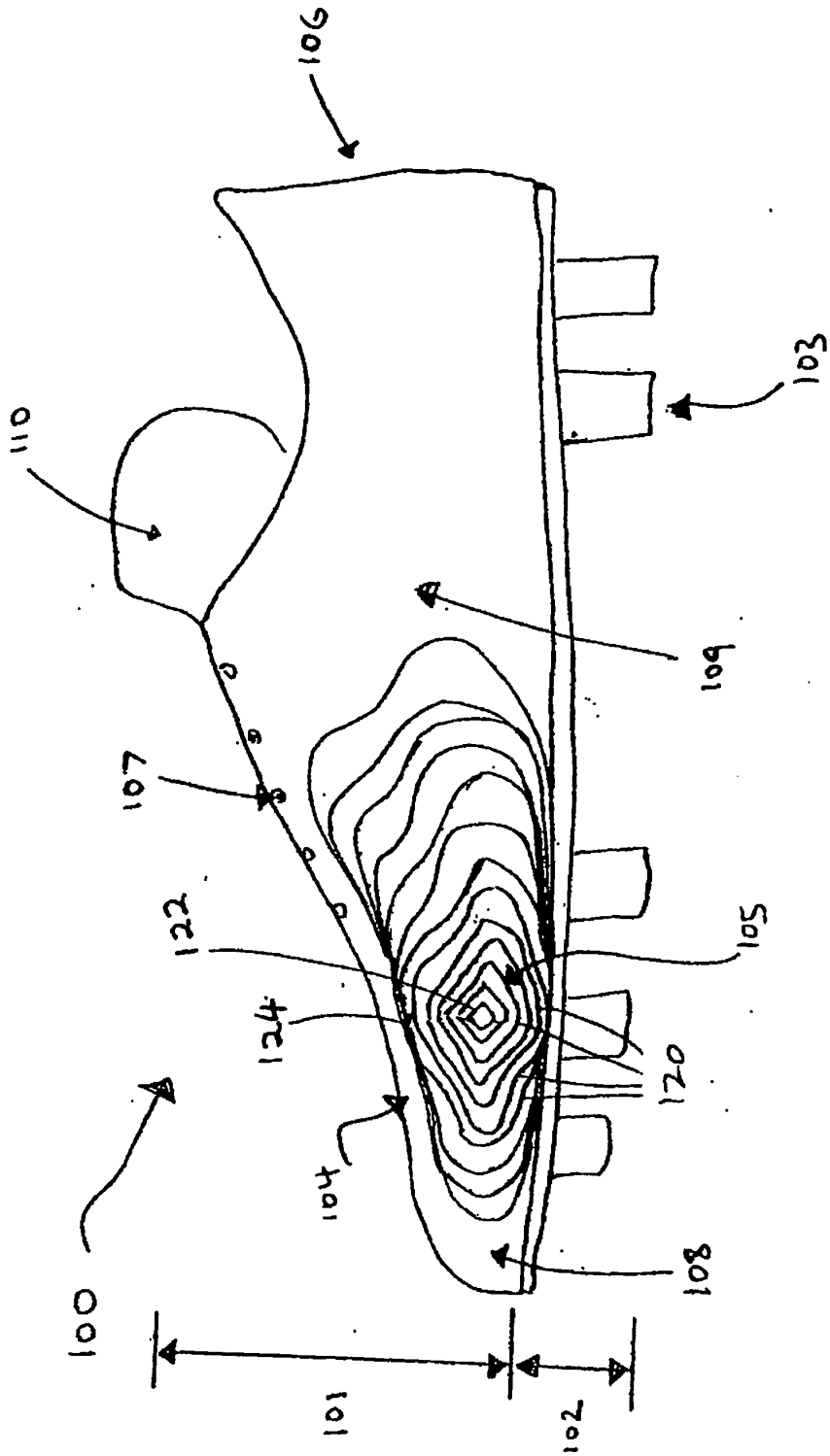


FIGURE 2

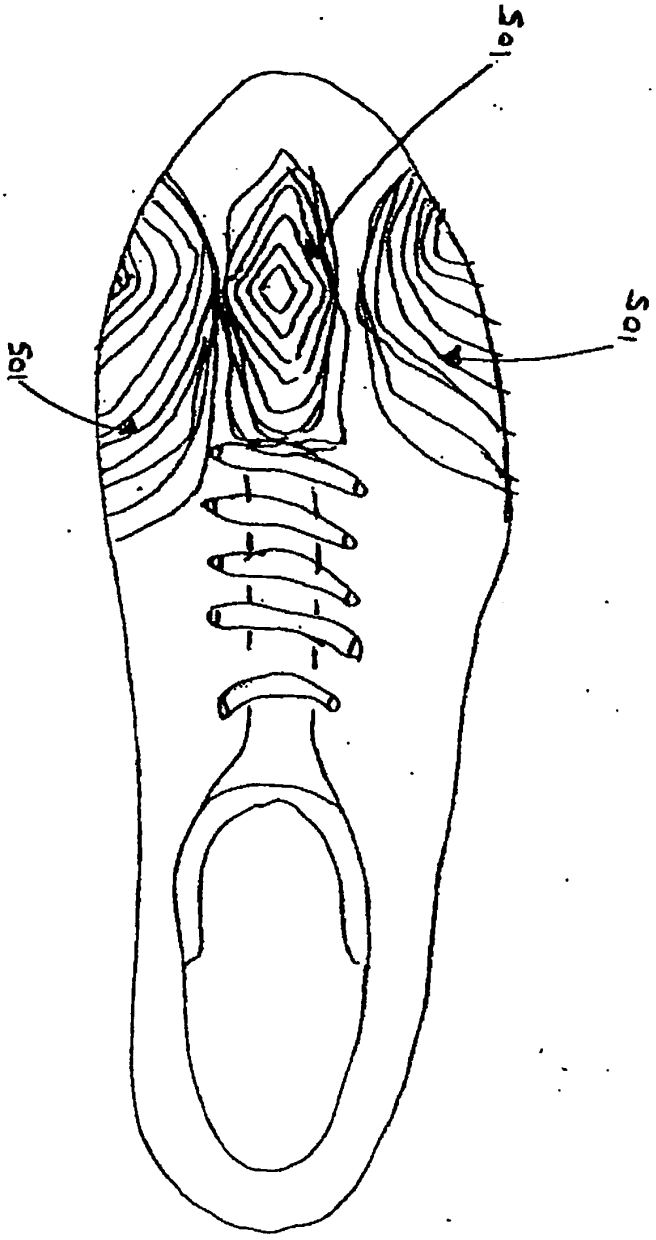


FIGURE 3

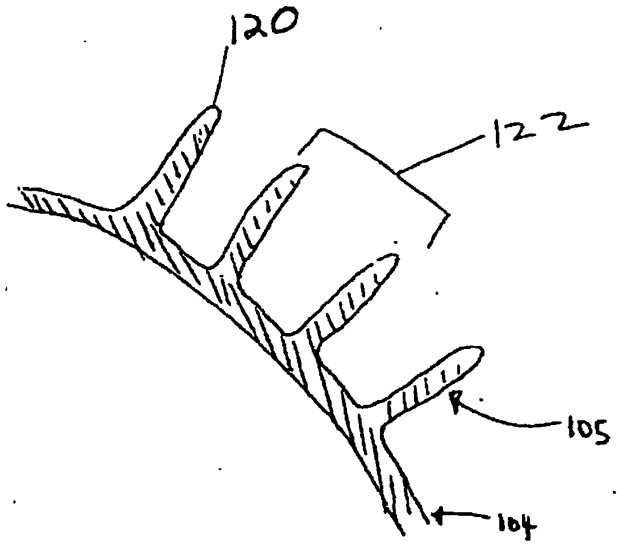


FIGURE 4

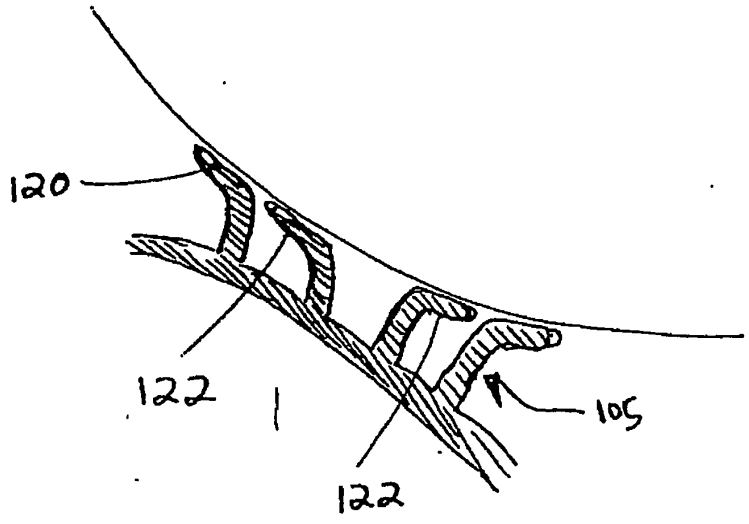


FIGURE 5A

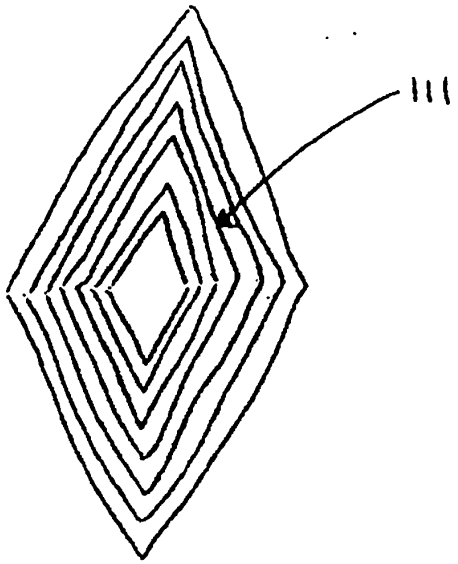


FIGURE 5B

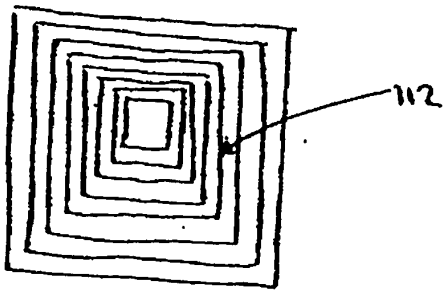


FIGURE 5C

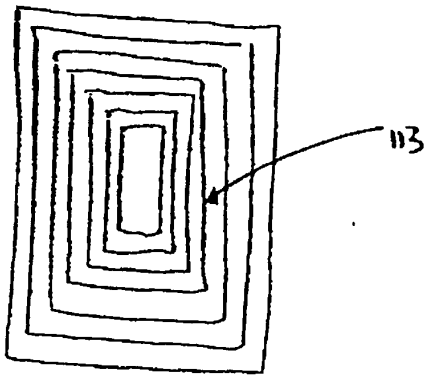


FIGURE 5G

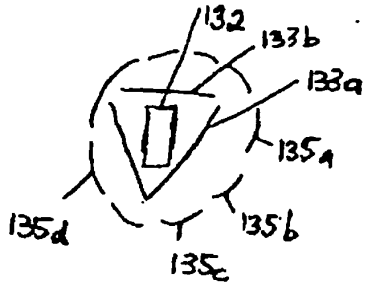


FIGURE 5E

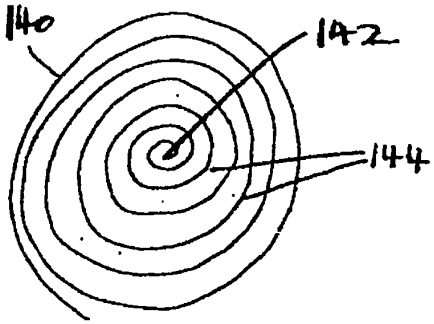


FIGURE 5F

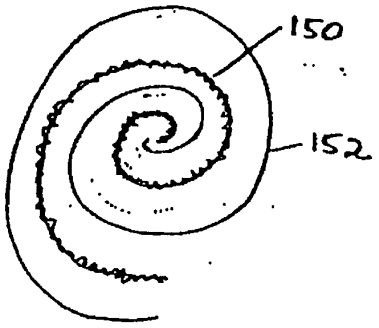


FIGURE 5D

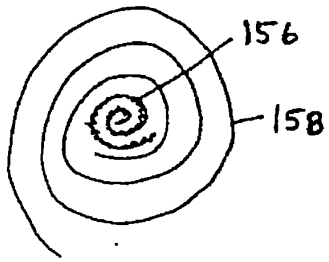


FIGURE 5H

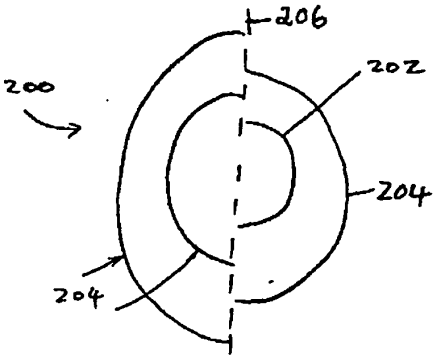


FIGURE 5I

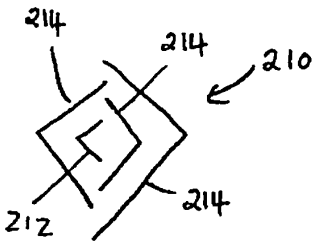


FIGURE 5J

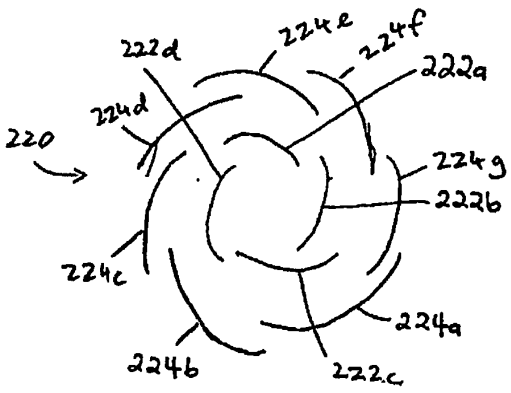


FIGURE 5K

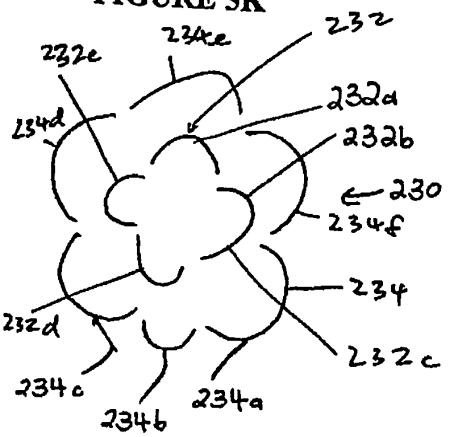


FIGURE 5L

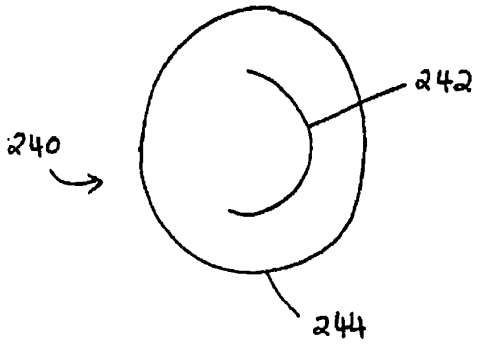


FIGURE 5M

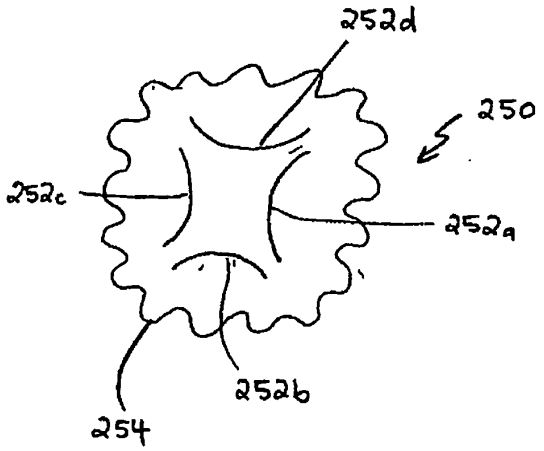


FIGURE 6A

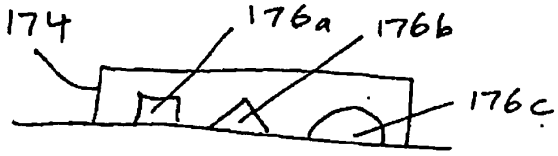


FIGURE 6B

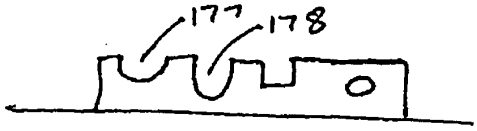


FIGURE 6C

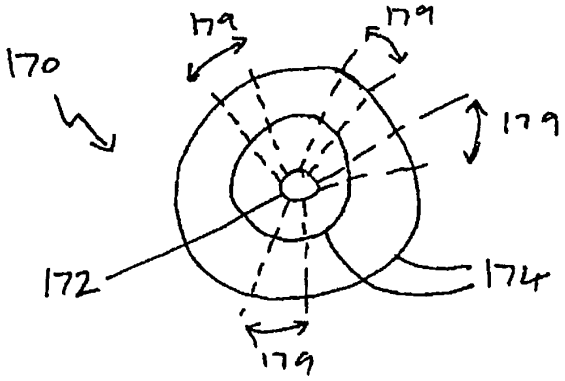


FIGURE 6D

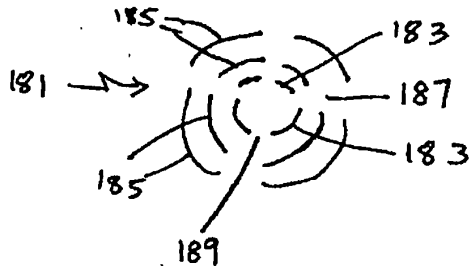


FIGURE 6E

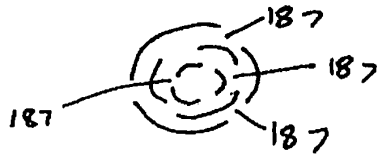


FIGURE 6F

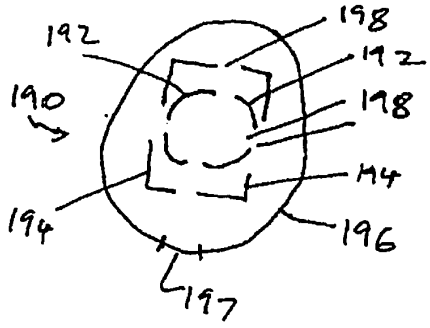


FIGURE 7A

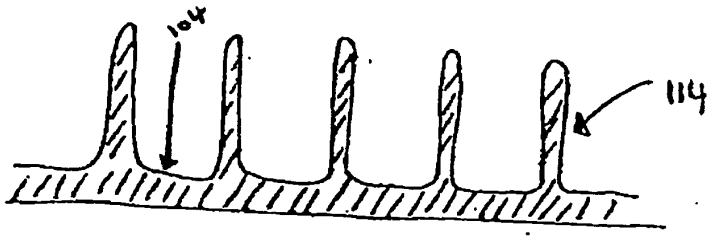


FIGURE 7B

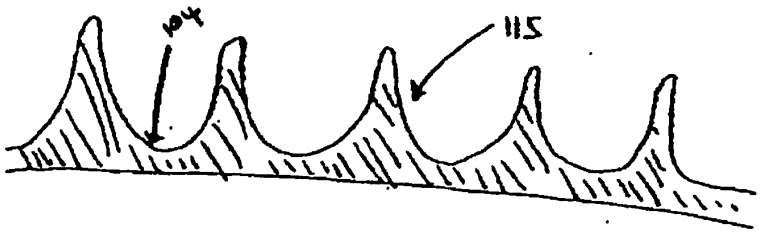


FIGURE 7C

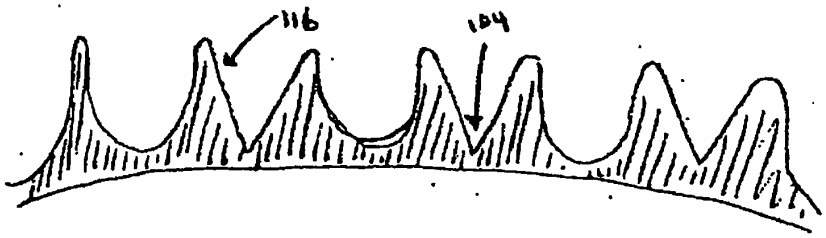


FIGURE 7D

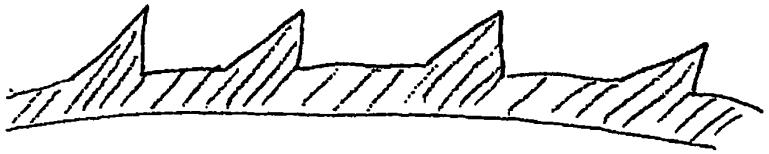
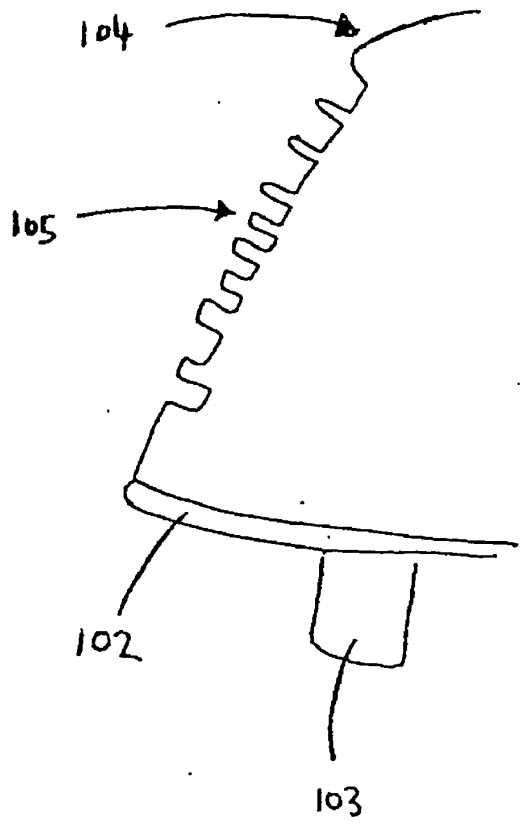


FIGURE 8



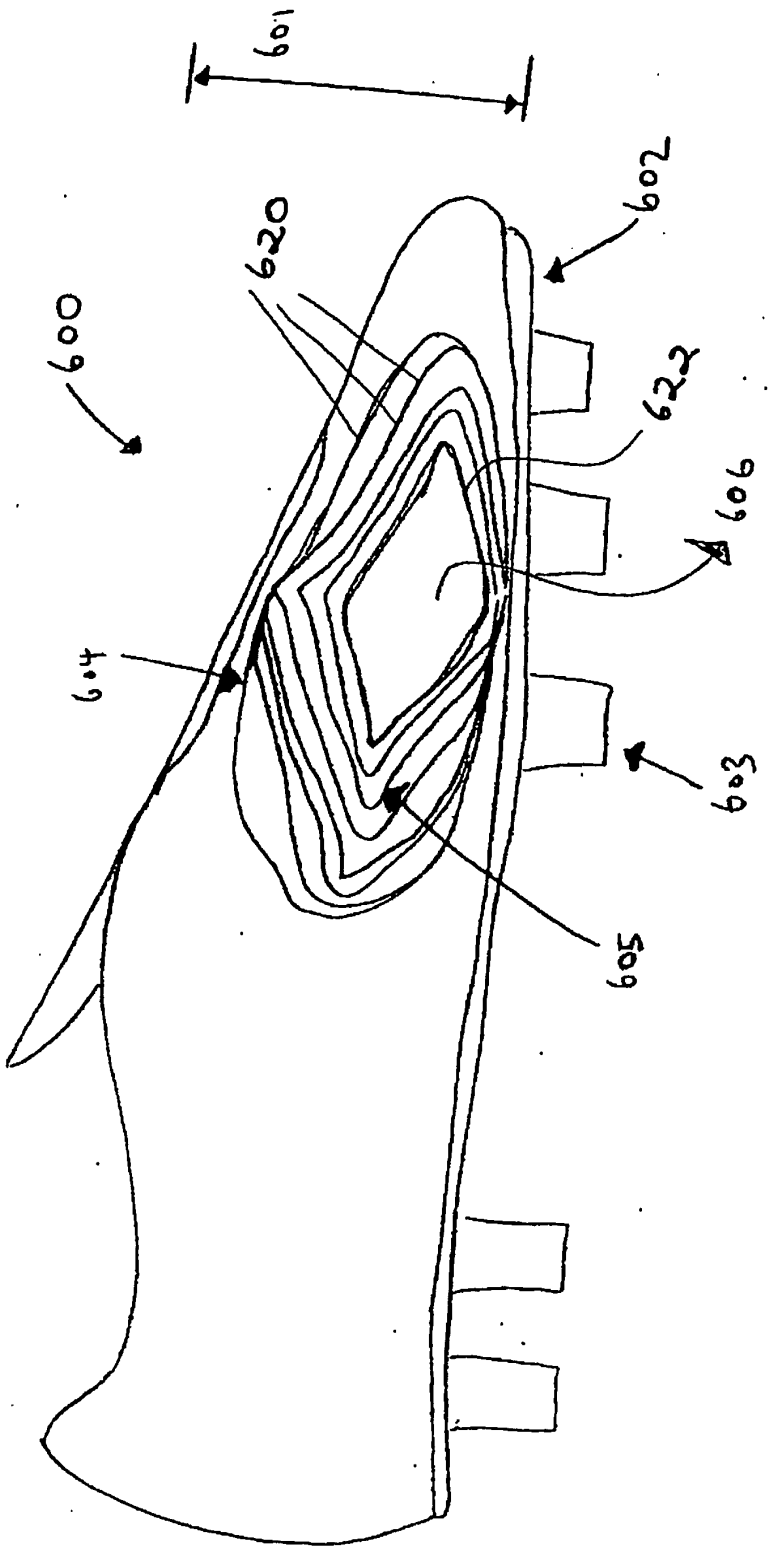


FIGURE 9

FIGURE 10

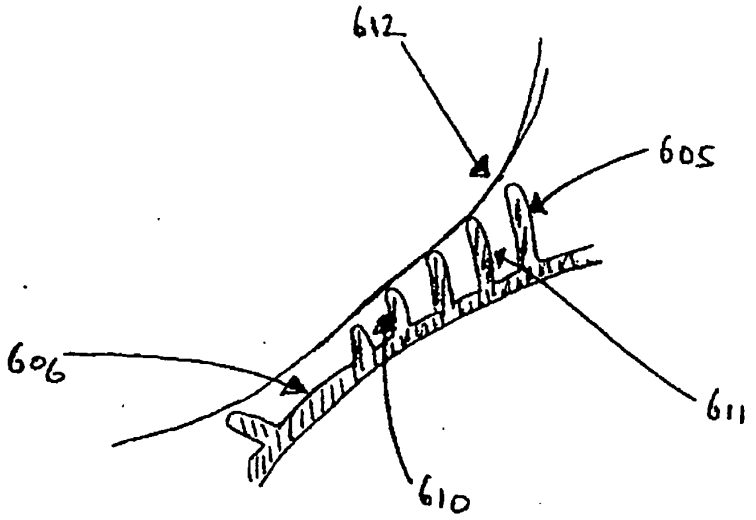


FIGURE 11

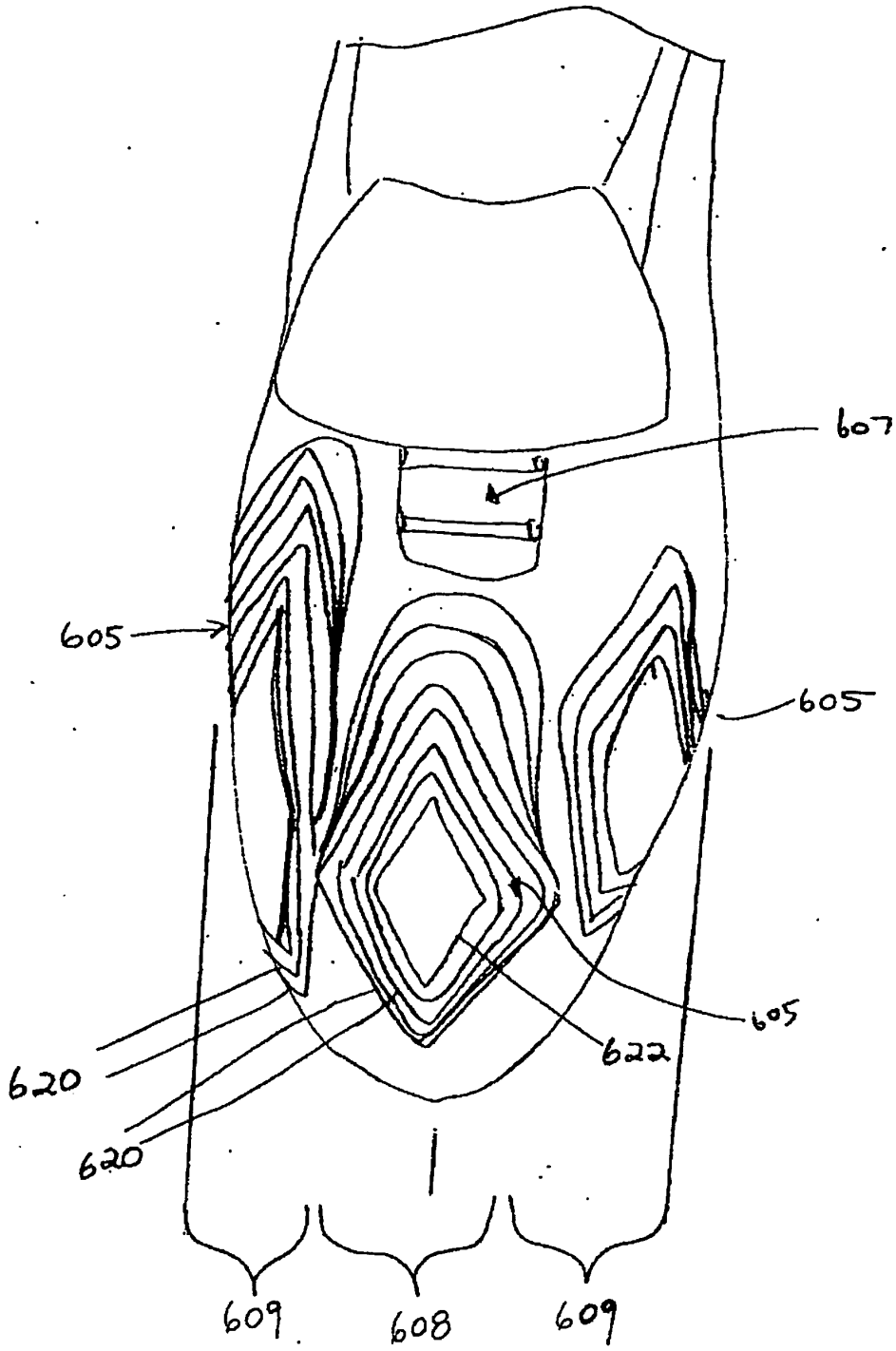


FIGURE 12A

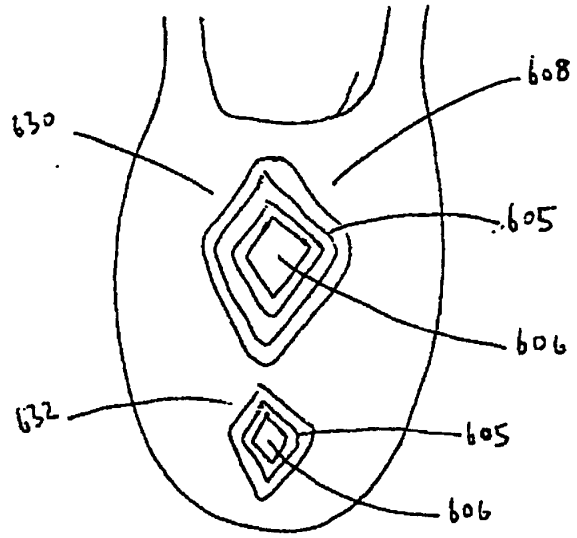


FIGURE 12B

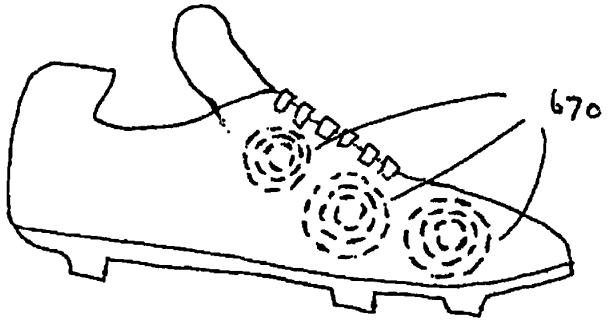
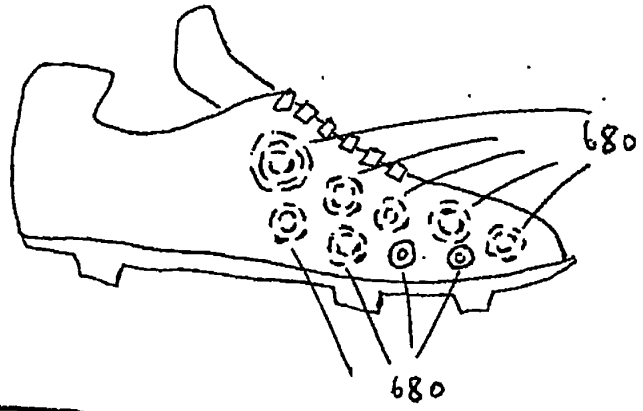


FIGURE 12C



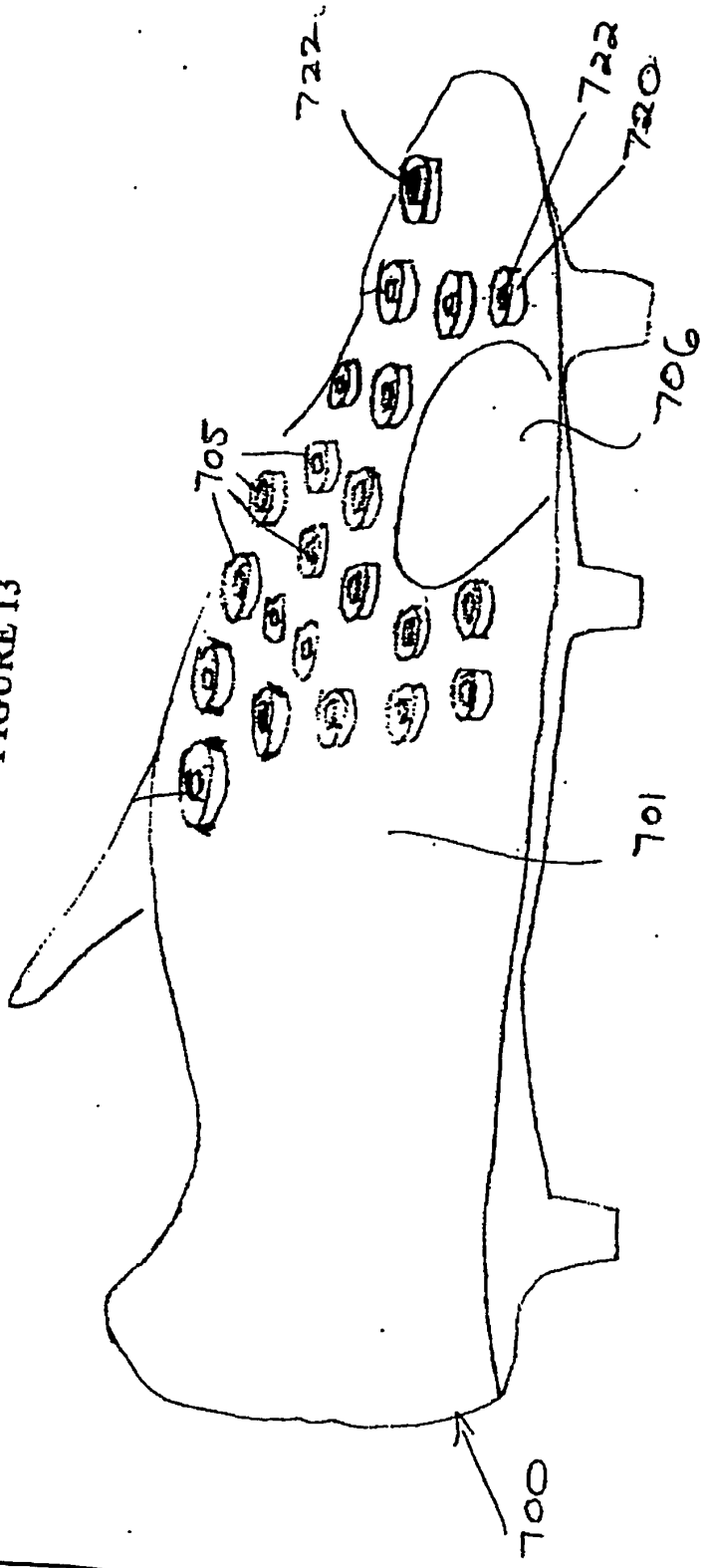


FIGURE 13

FIGURE 14

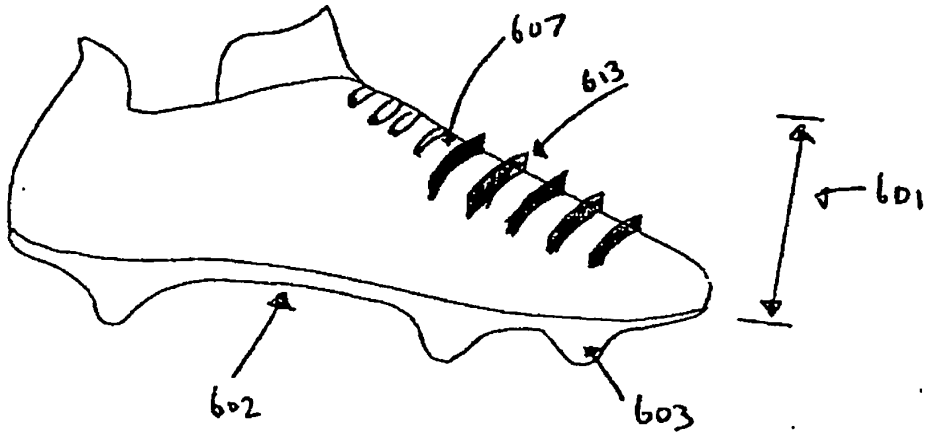


FIGURE 15

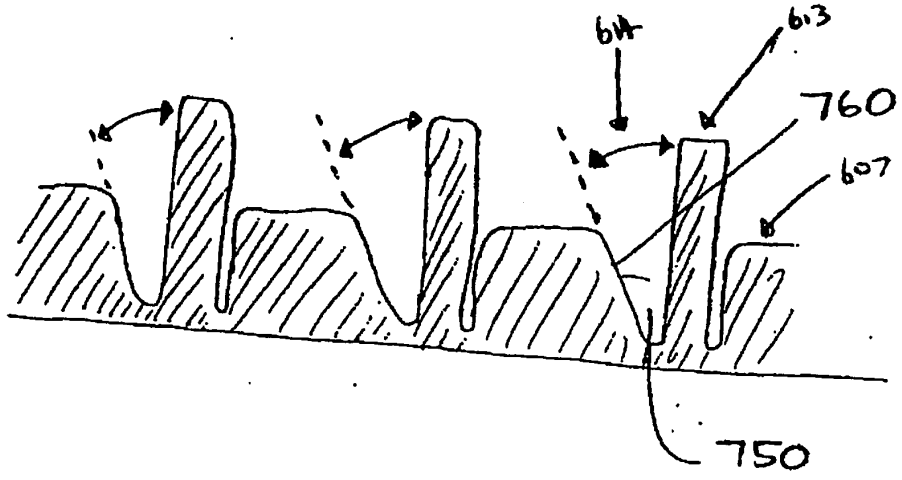


FIGURE 16

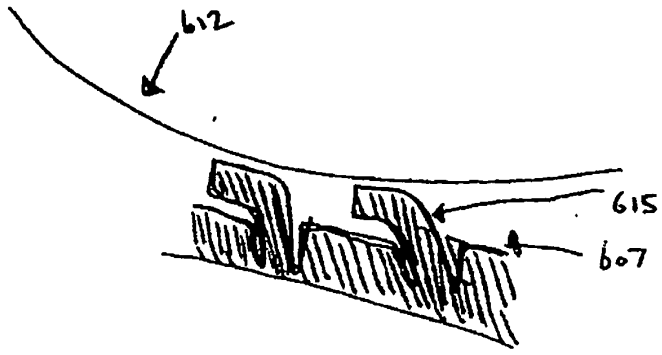


FIGURE 17

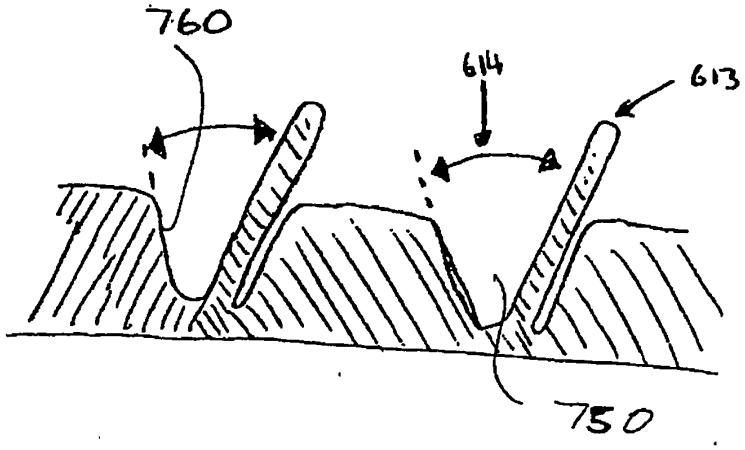


FIGURE 18